MONA Framework for Leading Change: The Small Satellite Paradigm

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Leading Change

• Establish a Sense of Urgency
• Developing a Vision and Strategy
• Create the Guiding Coalition
• Communicating the Change Vision
• Empowering Broad Based Action
• Generating Short Term Wins
• Consolidating Gains and Producing more Change
• Anchoring New Approaches in the Culture
Establish Sense of Urgency

The acquisition community has failed at delivering projects that meet cost, schedule and performance baselines: Acquisitions of Major Systems Must Change

**USAF Chief Scientist**
- Development is drawn out, creates expensive programs
- Tightly integrated, one-of-a-kind systems further expensive to upgrade
- Poor ability to integrate different platforms and systems developed over time
- Low Technical Agility/Resilience

**Policy and LAW**
- DoDI 5000.02: “Operation of the Defense Acquisition System”
- DoDD 8320.02: “Data Sharing in a Net-Centric DoD”
- CJCSI 6212.01F: “Net Ready KPPs”
- WSARA 2009
- Better Buying Power 2.0 Release (2013) OSD

**GAO**
- GAO Report: Assessments of Selected Weapons Programs, Mar 2007
- GAO Testimony Before US Senate Subcommittee: Space Acquisitions, March 2008 (SBIRS)
- GAO Report: 09-326SP Defense Acquisitions Assessments of Selected Weapons Programs
- GAO Report 10-477T DoD Persistent Challenges Remain in Developing Space Systems
Developing a Vision and Strategy

• MONA Vision: M->O->N Progression
  – Leverage Existing Investments in physical/electro mechanical Modularity
  – Grow Openness through carefully chosen interfaces and subsequent standards
  – Transition natl investments in Networked/IT systems for more rapid modernization

• “Step-In/Step Out” Strategy
  – Adopt and Tailor rather than re-invent
  – Join the consensus building and where appropriate nudge the process
  – Get onto the leading edge with DoD Architectural Concepts and Needs
  – Coordinate and Consult with Industry
  – Monitor Market Progress including civil, commercial and international
  – Then government “step out” and let industry “run with it”. Industry shall:
    • Develop and Maintain the Standards
    • Develop and Provide the Enabling Components
    • Develop and Provide the service to confirm MONA components adhere to stds
Create the Guiding Coalition

• Government Investments brought down the bulk of the NRE:
  • AFRL SPA/MONARCH (2004… ~$130M)
  • ORSO’s MSV (2006…~$50M)
  • DARPA F6 (2007… ~$ 70M)

• Natl Security Space coordination and collaboration through SUMO
  – Leveraging ~$2M in business case/ROI, architecting , standards
    • Business cases close with margin

• Industry working/steering groups
  – In formulation stage

• Professional societies for standards development  and training
  – Working with AIAA and NASA CII approaches/strategy

Pulling together a group with enough power to lead change and getting them to work as a team
Communicating the Change Vision

• Workshops/Conferences/Associations
  – MONA/SNAP Workshops
  – AIAA SPACE 2014
  – Architecting Conferences (Ground Systems Architecture Workshops….)
  – Natl Defense Industry Association

• “Role Models”
  – ORS MSV
  – HPO HPIU
  – UAV/UAS/RPA /FLEX (Air and Munitions)
  – Possible Space Test Program option with SIV (modular developmental test)
Empowering Broad Based Action

Physical Modularity
• Expandable
• Add future capability

Open
• License free standard
• Full insight into workings
• Improves interchangability

Software Modularity
• Hardware independent
• Adapts to changes with electronic ICDs
• Standard interfaces
• Fully reusable modules
• Software applications support different missions & payloads

Networked
• Decouples software from physical location
• Packetized (easy translation)
• Enables security auditing
• MLS Foundation

Encourage Ideas, Activities and Actions and Lower Barrier to Entry Across these 4 Fronts
Generating Short Term Wins

- **MSV**: Validating viability of MONA bus architectures for DoD space applications (ORS Program)

- **F6**: Validating MONA for inter-platform and payload interface applications (DARPA Program)

- **SUMO**: Validating business case for MONA and establishing a transition process (ODNI and Aerospace Corp Program)

- **SNAP**: Developing a MONA payload interface proof-of-concept demonstration (SMC XR with SDL Program)

- **SUMO (Space Universal MOdular Standards)** Industry Day in conjunction with National Space Symposium April 9-11
Consolidating the Gains and Producing more Change

**MONA Gains**

- Technology for MONA is becoming available—Boeing Phantom Phoenix and NG Eagle M
- Government has ability to incentivize or influence MONA—creating a new market
- Industry is beginning to see cost savings and competitive advantages emerging with a MONA or similar approach
- MONA approach enables reduced timelines and costs savings

- Encryption/Information Assurance solutions
  - F6 residuals: MLS development
  - AFRL R&D and SBIRs
  - Potential SMC/XR-HPO SNAP follow-on effort
- Power management/control
- Develop additional enabling components called out in SUMO
- Standards development for Key Interfaces
  - Government Incentivized
  - Industry Developed
- Provide Training Through Professional Societies/Open Forum

**Developing the People with Additional Projects**
Anchoring New Approaches in the Culture: The Small Satellite Contribution

• Continue MONA socialization
  – Small satellite builders join and influence CSIS
  – Lead the data and software architecture standards development
  – Attack the 4 Fronts

• Continue technology infusion
  – Consciously scale the effort for larger applications
  – Be at the forefront of tech demos, flight demos
  – Become the leader in developing the APPS layer
  – Broad collaboration of the small satellite form factor teams with: SMC/XR, HPO, ORSO, AFRL, DARPA, NRO, NASA, Industry

• Target operational on-ramps
  – Flight technology demonstrations/validations 2017+
  – Space environment monitoring
  – Space Situation Awareness Infrastructure

• Gives industry ample time to prepare to compete
Questions?

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